

3.6-3.9 Trig. Review

Key

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the equation for x on the interval $[0, 2\pi)$. Show work!

1) $\sin^2 x + \sin x = 0$

$$\sin x (\sin x + 1) = 0$$

$$\sin x = 0 \quad \sin x = -1$$

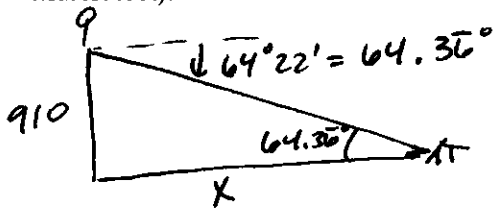
$$x = 0, \pi \quad x = 3\pi/2$$

1) _____

Solve the problem. Show work!

- 2) From a balloon 910 feet high, the angle of depression to the ranger headquarters is $64^\circ 22'$. How far is the headquarters from a point on the ground directly below the balloon (to the nearest foot)?

2) _____



$$\tan 64.36^\circ = \frac{910}{x}$$

$$x = \frac{910}{\tan 64.36^\circ} = 437 \text{ ft.}$$

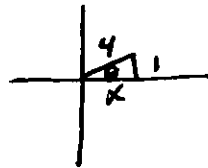
Find the exact value of the composition.

3) $\arccos[\sin(\pi/6)]$

$$\arccos\left(\frac{1}{2}\right) = \frac{\pi}{3}$$

3) _____

4) $\cos\left[\arcsin\left(\frac{1}{4}\right)\right]$



$$x = \sqrt{4^2 - 1^2}$$

$$x = \sqrt{15}$$

$$\cos \theta = \frac{\sqrt{15}}{4}$$

4) _____

Solve the equation for the interval $[0, 2\pi)$. Show work!

5) $2 \sin^2 x + \sin x = 1$

$$2 \sin^2 x + \sin x - 1 = 0$$

$$(2 \sin x - 1)(\sin x + 1) = 0$$

$$\sin x = 1/2 \quad \sin x = -1$$

$$x = \pi/6, \frac{5\pi}{6}, \frac{3\pi}{2}$$

5) _____

Solve the equation for the interval $[0, 2\pi)$. Show work!

6) $12 - 16 \sin x - 20 = 0$

$$-16 \sin x - 8 = 0$$

$$\sin x = \frac{8}{-16}$$

$$\sin x = -\frac{1}{2}$$

$$x = \frac{7\pi}{6}, \frac{11\pi}{6}$$

6) _____

Find the exact value of the real number y.

$$7) y = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \boxed{\frac{\pi}{3}}$$

7) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

8) The position of a weight attached to a spring is $s(t) = -4 \cos 5t$. What are the frequency and period of the system?

8) A

A) Frequency = $\frac{5}{2\pi}$ cycles per sec, period = $\frac{2\pi}{5}$ sec

B) Frequency = 5 cycles per sec, period = $\frac{1}{5}$ sec

C) Frequency = $\frac{\pi}{5}$ cycles per sec, period = $\frac{5}{\pi}$ sec

D) Frequency = $\frac{5}{\pi}$ cycles per sec, period = $\frac{\pi}{5}$ sec

$$f = \frac{|b|}{2\pi} \quad P = \frac{2\pi}{|b|}$$

$$f = \frac{5}{2\pi} \quad P = \frac{2\pi}{5}$$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the triangle. Show work!

9) $A = 31^\circ$, $B = 65^\circ$, $b = 9$

$$\frac{\sin 65^\circ}{9} = \frac{\sin 31^\circ}{a}$$

$$a = \frac{9 \sin 31^\circ}{\sin 65^\circ}$$

$$a = 5.11$$

$$\frac{\sin 84^\circ}{c} = \frac{\sin 65^\circ}{9}$$

$$c = \frac{9 \sin 84^\circ}{\sin 65^\circ} = 9.88$$

$$\boxed{\begin{array}{l} LC = 84^\circ \\ a = 5.11 \\ c = 9.88 \end{array}}$$

State whether the given measurements determine zero, one, or two triangles. Show work!

10) $A = 66^\circ$, $a = 26$, $b = 28$ two

10) _____

$$28 > 26 > 25.58$$

$$b > a > b \sin A$$

11) $A = 43^\circ$, $a = 3$, $b = 11$

$$3 < 7.5$$

$$a < b \sin A$$

none - zero

11) _____

12) $C = 30^\circ$, $a = 32$, $c = 16$

$$16 = 32 \cdot \sin 30^\circ$$

$$c = a \cdot \sin C$$

one

12) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Two triangles can be formed using the given measurements. Solve both triangles.

13) $B = 32^\circ, b = 27, c = 32$

13) D

A) $A = 96.9^\circ, C = 51.1^\circ, a = 14.4; A = 83.1^\circ, C = 128.9^\circ, a = 14.4$

B) $A = 96.9^\circ, C = 51.1^\circ, a = 50.6; A = 83.1^\circ, C = 128.9^\circ, a = 50.6$

C) $A = 109.1^\circ, C = 38.9^\circ, a = 15.1; A = 6.9^\circ, C = 141.1^\circ, a = 15.1$

D) $A = 109.1^\circ, C = 38.9^\circ, a = 48.1; A = 6.9^\circ, C = 141.1^\circ, a = 6.1$

$$\frac{\sin 32^\circ}{27} = \frac{\sin C_1}{32} \quad A_1 = 109.1^\circ \quad \angle C_2 = 180^\circ - \angle C_1 = 180^\circ - 38.9^\circ = 141.1^\circ$$

$$\sin C_1 = \frac{32 \cdot \sin 32^\circ}{27}$$

$$\angle C_1 = \sin^{-1}(.628) = 38.9^\circ$$

$$\frac{\sin 109.1^\circ}{a_1} = \frac{\sin 32^\circ}{27}$$

$$a_1 = \frac{27 \sin 109.1^\circ}{\sin 32^\circ} = 48.1$$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

The given measurements may or may not determine a triangle. If not, then state that no triangle is formed. If a triangle is formed, then use the Law of Sines to solve the triangle, if it is possible, or state that the Law of Sines cannot be used.

14) $B = 130^\circ, c = 8, b = 10$

$$\frac{\sin 130^\circ}{10} = \frac{\sin C}{8}$$

$$C = \sin^{-1}\left(\frac{8 \cdot \sin 130^\circ}{10}\right) = 37.8^\circ$$

$$\begin{aligned} C &= 37.8^\circ \\ A &= 12.2^\circ \\ a &= 2.8 \end{aligned}$$

$$\frac{\sin 12.2^\circ}{a} = \frac{\sin 130^\circ}{10}$$

$$a = \frac{10 \cdot \sin 12.2^\circ}{\sin 130^\circ} = 2.8$$

Solve the triangle.

15) $A = 51^\circ, b = 14, c = 7$

$$a = 11.03$$

$$B = 99.45^\circ$$

$$C = 29.55^\circ$$

$$a^2 = 14^2 + 7^2 - 2(14)(7) \cos 51^\circ$$

$$a^2 = 245 - 123.34$$

$$a = 11.03$$

$$\frac{\sin 51^\circ}{11.03} = \frac{\sin C}{7}$$

$$C = \sin^{-1}\left(\frac{7 \cdot \sin 51^\circ}{11.03}\right) = 29.55^\circ$$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the area. Round your answer to the nearest hundredth if necessary.

16) Find the area of the triangle with the following measurements:

16) A

$A = 58^\circ, b = 10 \text{ m}, c = 21 \text{ m}$

A) 89.05 m^2

B) 105 m^2

C) 55.64 m^2

D) 178.09 m^2

$$A = \frac{1}{2} \cdot 10 \cdot 21 \cdot \sin 58^\circ = 89.05 \text{ m}^2$$

17) Find the area of the triangle with the following measurements:

17) B

$B = 68^\circ, a = 14 \text{ cm}, c = 20 \text{ cm}$

A) 52.44 cm^2

B) 129.81 cm^2

C) 140 cm^2

D) 259.61 cm^2

$$A = \frac{1}{2} (14)(20) \sin 68^\circ = 129.81 \text{ cm}^2$$

Decide whether a triangle can be formed with the given side lengths. If so, use Heron's formula to find the area of the triangle.

- 18) $a = 27$
 $b = 14.5$
 $c = 10.5$
 A) 68.08
 C) 69.37

$$b + c \neq a$$

18) B

- 19) $a = 71$
 $b = 86$
 $c = 83.6$

$$a + c > b \text{ so, triangle can be formed.}$$

$$s = 120.3$$

$$A = \sqrt{120.3(49.3)(34.3)(36.7)} = 2732.35$$

- A) No triangle is formed.
 C) 2732.35

- B) No triangle is formed.
 D) 66.76

- B) 2734.15
 D) 3182.74

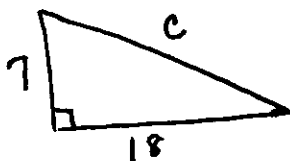
19) C

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

- 20) A building has a ramp to its front doors to accommodate the handicapped. If the distance from the building to the end of the ramp is 18 feet and the height from the ground to the front doors is 7 feet, how long is the ramp? (Round to the nearest tenth.)

20) _____



$$c = \sqrt{7^2 + 18^2} = 19.3 \text{ ft.}$$

- 21) Find the area of a triangular-shaped field with sides of 212.6 m and 185.3 m, and the included angle between them measuring 61.03° . Round to the nearest square meter.

21) _____



$$A = \frac{1}{2}(212.6)(185.3)\sin(61.03^\circ) = 17,232.72 \text{ m}^2$$

- 22) Find the area of a triangular garden if the sides are approximately 6 feet, 8 feet, and 13 feet.

22) _____

$$A = \sqrt{(13.5)(7.5)(5.5)(.5)} = 16.68 \approx 17 \text{ ft}^2$$

$$s = \frac{6+8+13}{2} = 13.5$$

Find the missing parts of the triangle.

23) $C = 127.7^\circ$

$a = 6.00 \text{ km}$

$b = 11.80 \text{ km}$

$$c^2 = 6^2 + 11.8^2 - 2(6)(11.8)\cos(127.7^\circ)$$

$$c^2 = 175.24 + 86.59$$

$$c = \sqrt{261.83} \approx 16.18$$

$$\frac{\sin 127.7^\circ}{16.18} = \frac{\sin B}{11.8}$$

$$\angle B = \sin^{-1}\left(\frac{11.8 \cdot \sin 127.7^\circ}{16.18}\right)$$

$$\angle B = 35.2^\circ$$

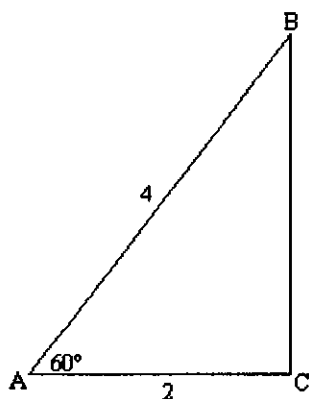
$$\angle A = 17.1^\circ$$

23) _____

24) _____

Find the indicated angle or side.

24) Find the length of side a.



$$a = 2\sqrt{3}$$